

Translation

PATENT COOPERATION TREATY

PCT/FR2003/001755



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference T020510 JKLC | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/FR2003/001755 | International filing date (<i>day/month/year</i>) 11 juin 2003 (11.06.2003) | Priority date (<i>day/month/year</i>) 19 juin 2002 (19.06.2002) |
| International Patent Classification (IPC) or national classification and IPC G01V 1/30, 1/28 | | |
| Applicant EARTH DECISION SCIENCES | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

| | |
|---|--|
| Date of submission of the demand 24 novembre 2003 (24.11.2003) | Date of completion of this report 22 June 2004 (22.06.2004) |
| Name and mailing address of the IPEA/EP | Authorized officer |
| Facsimile No. | Telephone No. |

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/FR2003/001755

I. Basis of the report

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☒ the description:
 pages _____ 1-9 _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☒ the claims:
 pages _____ 1-10 _____, as originally filed
 pages _____, as amended (together with any statement under Article 19
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☒ the drawings:
 pages _____ 1/3-3/3 _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
 These elements were available or furnished to this Authority in the following language _____ which is:
- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

| | | | |
|-------------------------------|--------|------|-----|
| Novelty (N) | Claims | 1-10 | YES |
| | Claims | | NO |
| Inventive step (IS) | Claims | 1-10 | YES |
| | Claims | | NO |
| Industrial applicability (IA) | Claims | 1-10 | YES |
| | Claims | | NO |

2. Citations and explanations**1. Reference is made to the following documents:**

D1: US-A-5 615 171
D2: US-A-6 138 076
D3: US-A-5 930 730
D4: US 2002/022930 A1
D5: US-A-6 151 555

2. D1, which is considered to be the prior art closest to the subject matter of independent claim 1, describes (the references between parentheses apply to said document):

A method for smoothing a subsurface property in a geological structure represented by seismic measurements, wherein a continuous function $S_{ij,k}(t)$ is constructed by interpolating or approximating the discrete seismic traces of a pluridimensional seismic matrix, said function $S_{ij,k}(t)$ being designated as "continuous local seismic trace", comprising the following steps:

(a) using, as the optimal offset of two adjacent continuous local seismic traces $S_{ij,k}(t)$ and $S_{pq,k}(t)$,

the offset value that maximises the correlation function thereof, said offset not necessarily being an integer multiple of the vertical sampling pitch (column 2, line 34 to column 3, line 11);

(b) retaining, as the conditional adjacency of a "central" continuous local seismic trace $S_{ij,k}(t)$, the sub-adjacency consisting of adjacent traces $S_{pq,k}(t)$ corresponding to optimal offsets associated with correlations $R_{ij,pq,k}(h)$ greater than a predetermined threshold between 0 and 1 (column 3, lines 12 to 31, column 6, lines 36 to 54);

(c) selecting a subsurface property to be smoothed in the conditional adjacency of a point (i, j, k) of a reference "central" continuous local seismic trace;

(d) offsetting the subsurface properties of the conditional adjacency by translating the current variable of the optimal offset value $(h_{ij,pq,k})$;

(e) considering, as smoothed value at point (i, j, k) , an average of the subsurface properties offset in step (d).

Consequently, the subject matter of claim 1 differs from that known from D1 in that the last three steps of the method are not performed.

The subject matter of claim 1 is therefore novel (PCT Article 33(2)).

3. The problem that the present invention is intended to solve can be considered to be that of improving

smoothing and enabling simple rapid smoothing, while not smoothing discontinuities.

4. The solution to this problem, as proposed in claim 1 of the present application, is considered to involve an inventive step (PCT Article 33(3)) for the following reason:

Although the other documents apparently disclose, in a variety of ways, steps (a), (b) (D3: column 1, line 66 to column 2, line 6; column 6, lines 25 to 45; column 9, line 63 to column 10, line 12; D4: page 2, paragraphs 23 to 27; D5: column 8, line 66 to column 9, line 20; column 12, line 16 to column 13, line 30) and even the problem of smoothing (D2: column 37, lines 37 to 58; D5 column 15, lines 8 to 29), the solution proposed in claim 1 is not a routine measure for a person skilled in the art and the closest prior art does not suggest the solution set forth in said claim.

5. Claims 2 to 12 are dependent on claim 1 and therefore also comply, as such, with the PCT requirements of novelty and inventive step.
6. The industrial applicability of the device described in claim 1 is obvious.